

CLAIMS

What is claimed is:

1. A method, comprising:
generating an electric field proximate an edge of a protruding section of an electrode,
the electric field defining a vector; and
forming an elongated nanostructure located at a position on a surface of a substrate,
the position on the surface of the substrate proximate the edge of the
protruding section of the electrode, at least one tangent to the elongated
nanostructure i) substantially parallel to the vector defined by the electric field
and ii) substantially non-parallel to a normal defined by the surface of the
substrate.
2. The method of claim 1, wherein forming includes plasma enhanced chemical vapor
deposition.
3. The method of claim 1, wherein forming the elongated nanostructure includes forming
a plurality of substantially aligned nanostructures.
4. The method of claim 3, wherein the plurality of substantially aligned nanostructures
include a plurality of carbon nanofibers.
5. The method of claim 3, wherein the plurality of substantially aligned nanostructures
include a plurality of carbon nanotubes.
6. The method of claim 3, wherein the plurality of substantially aligned nanostructures
are formed using a plurality of catalyst nanoparticles including at least one element selected
from the group consisting of nickel, iron and cobalt.
7. The method of claim 1, further comprising:

changing a direction associated with the vector; and
continuing to form the elongated nanostructure.

8. The method of claim 7, wherein changing the direction associated with the vector includes moving the protruding part of the electrode relative to a nonprotruding part of the electrode.
9. The method of claim 1, further comprising moving the substrate relative to the edge of the protruding section of the electrode.
10. A product made by the method of claim 1.
11. A method, comprising:
generating an electric field proximate a position on a surface of a substrate, the electric field defining a vector;
forming an elongated nanostructure located at the position on the surface of the substrate; then
changing a direction associated with the vector; and
continuing to form the elongated nanostructure, at least one tangent to the elongated nanostructure substantially non-parallel to a normal defined by the surface of the substrate.
12. The method of claim 11, wherein forming includes plasma enhanced chemical vapor deposition.
13. The method of claim 11, wherein forming the elongated nanostructure includes forming a plurality of substantially aligned nanostructures.
14. The method of claim 13, wherein the plurality of substantially aligned nanostructures include a plurality of carbon nanofibers.

15. The method of claim 13, wherein the plurality of substantially aligned nanostructures include a plurality of carbon nanotubes.
16. The method of claim 13, wherein the plurality of substantially aligned nanostructures are formed using a plurality of catalyst nanoparticles including at least one element selected from the group consisting of nickel, iron and cobalt.
17. The method of claim 11, wherein changing the direction associated with the vector includes moving a protruding part of an electrode upon which the substrate is mounted relative to a nonprotruding part of the electrode.
18. The method of claim 11, further comprising moving the substrate relative to an edge of a protruding section of an electrode.
19. A product made by the method of claim 11.
20. A method, comprising:
generating an electric field proximate a position on a surface of a substrate, the electric field defining a vector;
forming an elongated nanostructure located at the position on the surface of the substrate; then
moving the position on the surface of the substrate; and
continuing to form the elongated nanostructure, at least one tangent to the elongated nanostructure substantially non-parallel to a normal defined by the surface of the substrate.
21. The method of claim 20, wherein forming includes plasma enhanced chemical vapor deposition.
22. The method of claim 20, wherein forming the elongated nanostructure includes

forming a plurality of substantially aligned nanostructures.

23. The method of claim 22, wherein the plurality of substantially aligned nanostructures include a plurality of carbon nanofibers.

24. The method of claim 22, wherein the plurality of substantially aligned nanostructures include a plurality of carbon nanotubes.

25. The method of claim 22, wherein the plurality of substantially aligned nanostructures are formed using a plurality of catalyst nanoparticles including at least one element selected from the group consisting of nickel, iron and cobalt.

26. The method of claim 20, further comprising changing the direction associated with the vector.

27. The method of claim 26, wherein changing the direction associated with the vector includes moving a protruding part of an electrode upon which the substrate is mounted relative to a nonprotruding part of the electrode.

28. A product made by the method of claim 20.

29. A composition, comprising an elongated nanostructure including a first segment defining a first axis and a second segment coupled to the first segment, the second segment defining a second axis that is substantially nonparallel to the first axis.

30. The composition of claim 29, wherein said elongated nanostructure includes a carbon nanotube.

31. The composition of claim 29, wherein said elongated nanostructure includes a carbon nanofiber.

32. The composition of claim 29, further comprising a substrate coupled to the elongated nanostructure.

33. The composition of claim 32, further comprising another elongated nanostructure coupled to the substrate.

34. The composition of claim 33, wherein the another elongated nanostructure defines another axis that is substantially parallel to one axis selected from the group consisting of the first axis and the second axis.

35. A biological sensor, comprising the composition of claim 29.

36. A scanning probe microscopy tip, comprising the composition of claim 29.

37. An apparatus, comprising an electrode including:
a protruding section defining an edge; and
a nonprotruding section coupled to the protruding section,
wherein the edge is adapted to deflect an electric field generated with the electrode and
at least one section selected from the group consisting of the protruding section
and the nonprotruding section is adapted to support a substrate for the growth
of elongated nanostructures.

38. The apparatus of claim 37, wherein the nonprotruding section is repositionable relative to the protruding section.

39. The apparatus of claim 38, wherein the nonprotruding section can be reversibly positioned substantially adjacent the edge so as to return the electric field to a nondeflected state.

40. The apparatus of claim 38, wherein the protruding section includes a substantially orthogonal pedestal.
41. The apparatus of claim 37, further comprising another protruding section coupled to the nonprotruding section, the another protruding section defining another edge.
42. The apparatus of claim 37, further comprising a counter electrode coupled to the electrode.
43. The apparatus of claim 37, further comprising a substrate holder coupled to the protruding section.
44. The apparatus of claim 43, wherein the substrate holder is repositionable relative to the protruding section.
45. The apparatus of claim , further comprising a substrate holder coupled to the nonprotruding section.
46. The apparatus of claim 45, wherein the substrate holder is repositionable relative to the nonprotruding section.
47. A plasma enhanced chemical vapor deposition chamber comprising the apparatus of claim 37.